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FOUR NEW SPECIES OF DECAPOD CRUSTACEANS FROM PORTO RICO[1]

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Representatives of three new species of shrimps, one constituting a new genus, and a new hermit crab were found among the Crustacea obtained by the expedition of the New York Academy of Sciences to Porto Rico in 1915, and are described in the present paper under the following names: *Synalpheus osburni*, *Periclimenes portoricensis*, *Gnathophylloides* (new genus) *mineri*, and *Paguristes tortugae*.

Synalpheus osburni, new species

Figure 1

Apparently an undescribed species of the *laevimanus* group, belonging among the species in which the scaphocerite is represented by the spine alone, no trace of the blade remaining, at least in the female sex.

DESCRIPTION.—The frontal margin like *S. rathbunae* suggests *S. goodei*, but the rostral projection is so much longer than the lateral projections that it sets this species quite apart from those to which it seems most nearly related. The antennular articles are related to one another about as 3, 1.5, 1. The superior angle of the basicerite forms a well-marked subacute tooth or spine about in line with the extremities of the lateral projection of the front; though relatively much less developed than in *S. rathbunae*, the development is greater than in other American "*laevimanus*" species, with the possible exception of *S. goodei*, which differs, however, in having the scaphocerite furnished with a scale or blade in both sexes, besides having the tubercle on the palmar border of the large chela of different shape and armature. The spine of the scaphocerite exceeds the antennular peduncle a little, while the carpocerite exceeds it by nearly twice the length of its distal article.

The large chela has a blunt, forwardly directed tubercle on the palmar border, and with considerable magnification a small spine, directed obliquely downward, may be observed on its lower side. The carpus of the small cheliped is a little less than half the length of the chela; the fingers are more or less two-toothed distally, there being a slight notch and adjacent low, scarcely perceptible tubercle near the extreme tip of either finger.

Distally, the telson narrows markedly and is armed dorsally with two pairs of large prominent spines; the posterior border likewise carries four stout spines of which the outer pair is the shorter; between the median pair there are in a lower row four long slender spines, secondarily feathered; above these, likewise inserted on the posterior margin but in an upper row, are two pairs of shorter, more slender, naked

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setae of which the outer pair is the longer. The outer margin of the external branch of the uropods is armed above the tranverse suture with ten teeth, of which the last two on the right outer blade and the penultimate tooth on the left one seem to have been broken off or injured.

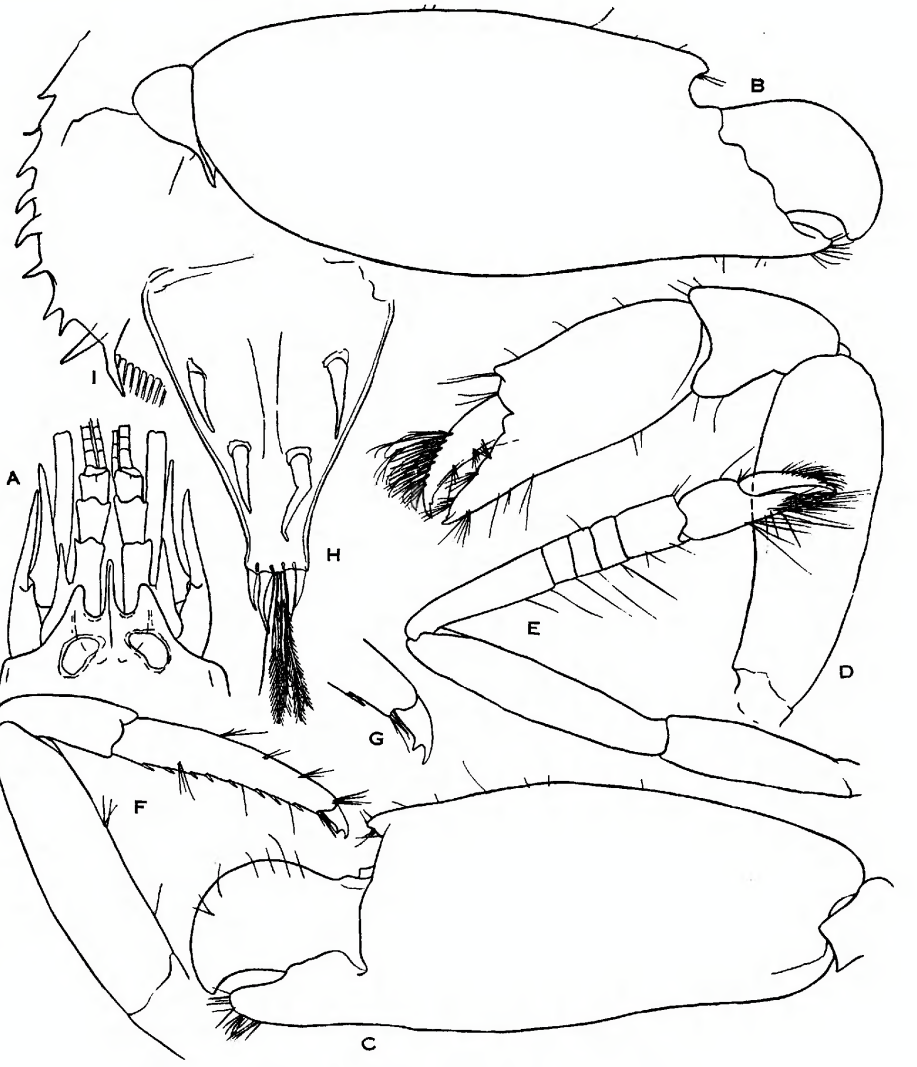

Fig. 1. *Synalpheus osburni*, new species.

a, front from above; *b*, *c*, large chela, inner and outer aspects; *d*, small chela; *e*, second leg; *f*, third leg; *g*, dactyl enlarged; *h*, telson; *i*, outer margin of uropod.

TYPE LOCALITY.—The type (Cat. No. 3599, A. M. N. H.), a single ovigerous female with but very few eggs remaining, of approximately 15 mm. in length, was taken from inside Cayo Maria Langa, near Guay-

anilla Harbor, Porto Rico, June 25, 1915, by Dr. Raymond C. Osburn, for whom the species is named.

Periclimenes portoricensis, new species

Figure 2

DESCRIPTION.—A small species that hitherto does not seem to have been recognized or even collected. In Kemp's arrangement of the Pontoniinae[1] it keys out in the first section of the subgenus *Ancylocaris*, among the species without a spine or tooth at the distal end of the lower border of merus of second leg, without supraorbital and hepatic spines, and with second legs longer than the first. Thus, in his key, it is grouped with *P. pusillus* Rathbun from Hawaii. Our species may be distinguished at first glance from *P. pusillus* by its shorter rostrum and greater number of rostral teeth above and below. In *P. pusillus* the rostrum exceeds the antennular peduncle by nearly the length of the last segment, though possessing but six teeth above and two below; the first of the dorsal teeth is slightly in advance of the hind margin of the orbit.

The rostrum of our species reaches to the middle of the third segment of the antennular peduncle or a little beyond. It is armed above with twelve teeth, of which two are situated on the carapace, and below with three. The more distal inner thickened portion of the basal segment of the antennular peduncle, with which the second segment of the peduncle articulates, is quite well marked off from the thinner external lateral and basal portions of the basal segment, though not separately articulated, as might appear from the accompanying sketch (Fig. 2*b*); the second and third segments are about the same length, measured on the median line. The fused portion of the outer antennular flagella consists of but two joints; the thicker, shorter ramus has seven free joints and the outer, thinner branch twenty-six; the inner of the two antennular flagella has about twenty-one joints. The antennal scale is about three and two-thirds times as long as wide, the spine and blade reach about equally far forward.

The third maxilliped possesses a strong terminal claw which comprises a full third of the last joint, this, including the claw, is a little longer than the penultimate joint; the antepenultimate joint is nearly as long as the two following taken together, excepting only about half the length of the terminal claw.

I take the dactyl of the third and following pairs of legs to be simple. There is a very slight indication of a lobe, perhaps suggested by the rather slight sinus or very shallow bending in of the ventral margin just before the tip of the dactyl. Though to a slight degree resembling the condition found in *P. noverca* Kemp,[2] this species in other respects is quite different. If the dactyls were considered comparable to those of *P. noverca*, our species, lacking a hepatic spine, would fall within the subgenus *Periclimenaeus*, none of the known representatives of which it remotely resembles.

The proximal pair of dorsal spines on the telson are inserted at about the middle of its length, the distal pair a little less than half the distance from the proximal pair to the end of the telson; of the three pairs of spines arming the hind margin the median pair is quite slender and is furnished with hairs.

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[1] 1922, Rec. Indian Mus., XXIV, part 2, pp. 119, 137, and particularly p. 167.
[2] *Op. cit.*, p. 162, Fig. 29*d*.

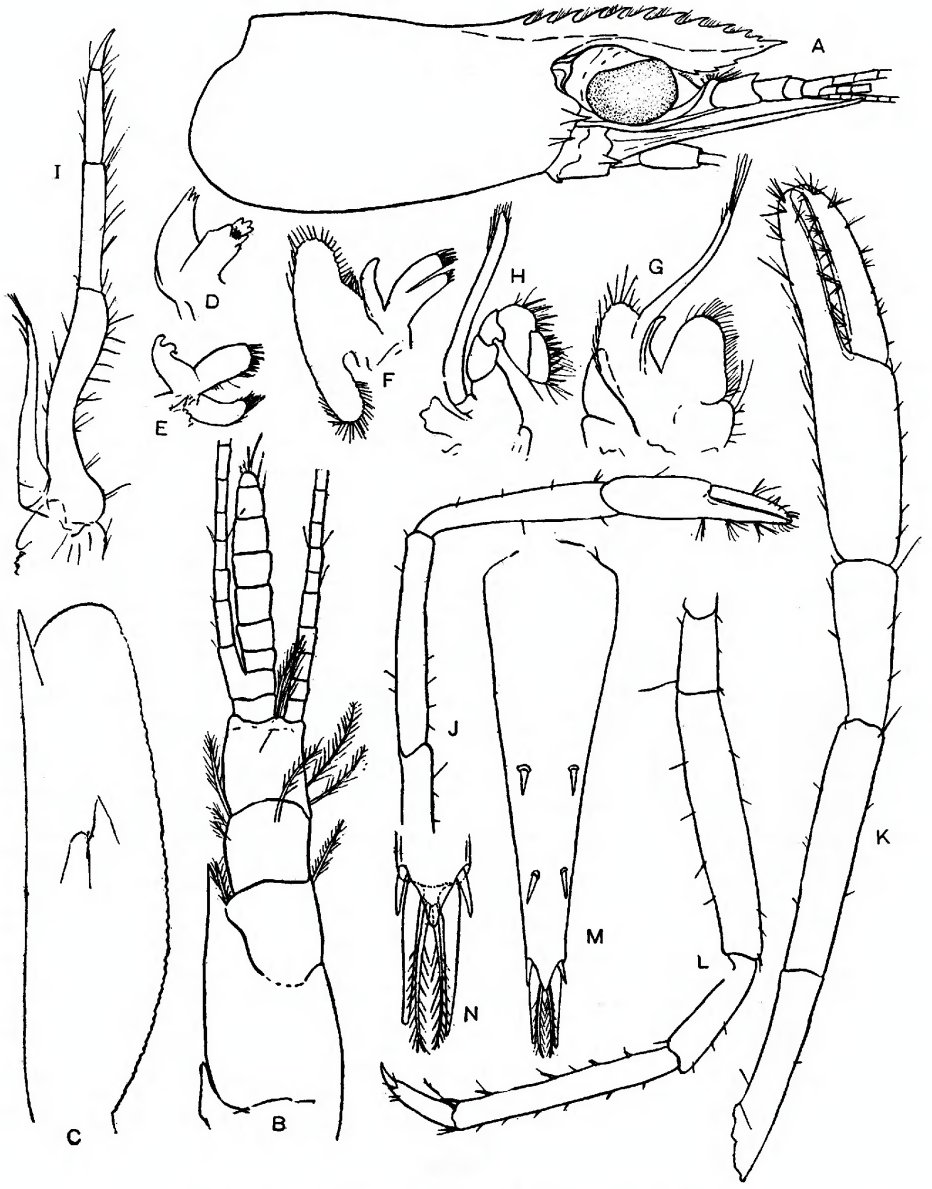

Fig. 2. *Periclimenes portoricensis*, new species.

a, carapace and front, from side; *b*, antennule; *c*, antennal scale; *d*, mandible; *e*, maxillula; *f*, maxilla; *g*, *h*, *i*, first, second, and third maxillipeds; *j*, first leg; *k*, second leg; *l*, third leg; *m*, telson; *n*, tip enlarged.

TYPE LOCALITY.—Known only from the lone female type (Cat. No. 3676, A. M. N. H.), which is about fourteen and one-half mm. long; carapace and rostrum together about four and one-fifth mm., more or less; from Porto Rico, without specific locality data; taken July, 1914.

GNATHOPHYLLOIDES, new genus

Figure 3

DESCRIPTION.—Closely related to *Gnathophyllum*, *Phyllognathia*, and *Hymenocera*, yet revealing a combination of characters that does not satisfactorily admit its inclusion in any of the three known genera at present constituting the family. General appearance much like *Gnathophyllum*, with a short, compressed and dentate rostrum, but with body not quite so stout; carapace differing from the other members of this genus in that the anterior border on either side, below the antennal spine, is not produced in advance of the spine. The rostrum of the genotype is a little damaged but appears to be armed with three relatively stout, subequal, equidistant teeth behind the acute tip; on the inferior margin there is a small tooth slightly behind the extremity. The condition of the rostrum is such that at a break in the rostrum above the inferior subapical tooth it is not possible to determine definitely whether or not a similar, though very much smaller, tooth may have been present on the upper margin. In a smaller specimen with uninjured rostrum there are, as figured and described above, three teeth, and below a smaller tooth near the tip. The eye is stout and appears to be without the tubercle characteristic of *Gnathophyllum*, which is more or less developed in other representatives of the family. However, it appears somewhat angulated or peaked where the inferior and anterior borders meet.

The outer or third maxilliped conforms in general appearance and structure with that of *Gnathophyllum*, so that on the basis of this character alone the genotype might well have been assigned to that genus. I cannot distinguish the notch or even a suggestion of it marking off the ischium from the merus, as remarked by Borradaile in his characterization of *Gnathophyllum*.[1] The third maxilliped is often indifferently drawn by authors, so a comparison of this point in the various species cannot be made without specimens. The exopodite is considerably longer than the endopodite, and so apparently differs quite markedly from all other gnathophyllids which, so far as I have been able to ascertain, have the exopodite shorter than the endopodite.

The second maxilliped, though not unlike that of *Hymenocera*, most resembles that of *Phyllognathia ceratophthalma*, and distally is quite unlike the "scythe shaped" organ formed by the last two joints of this appendage in *Gnathophyllum*.

The first maxilliped has, likewise, more the appearance of the corresponding appendage in *Phyllognathia* and *Hymenocera* than in *Gnathophyllum*.

In *Gnathophyllum* the maxillula tends to become distally widened or expanded, relatively more so than in our genus where in shape and expansion it is intermediate between the foregoing genus and *Hymenocera* on one hand and *Phyllognathia* on the other. The mandible, likewise, seems to be of an intermediate form.

More striking are the differences exhibited by the legs and the armature of the telson. The second chelipeds have exceedingly short carpal, meral, and ischial joints, and the ambulatory legs as compared with the other genera, are remarkably short

[1]Trans. Linn. Soc. London, (2) XVII, part 3, p. 409.

and stout. They lack the relatively longer and characteristically bifid dactyls common to the known species of *Gnathophyllum* and *Phyllognathia*, or the less stout, simple dactyls of the described *Hymenocera*. The dactyls of the ambulatory legs of the genotype are unique within the family: short, stout, somewhat ovoid, armed with a stout terminal claw, immediately beneath which may be found a pair of slender spines, or

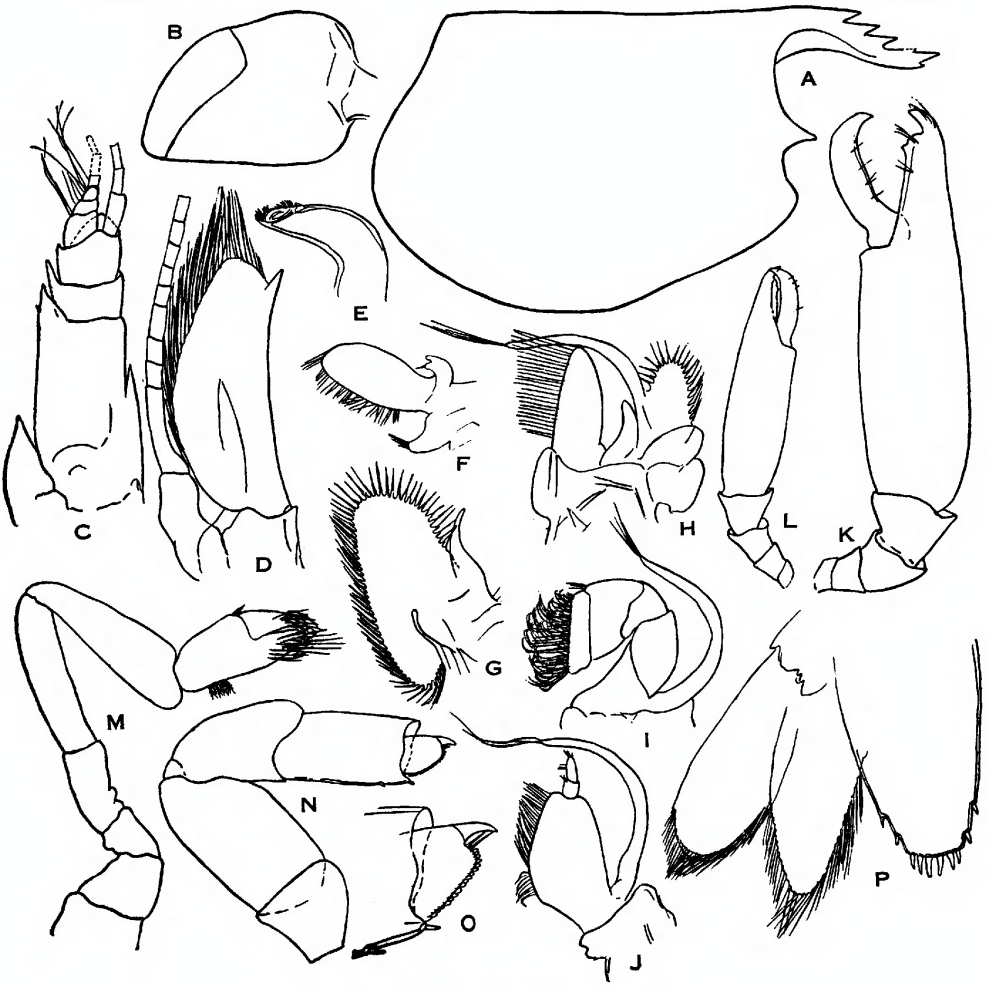

Fig. 3. *Gnathophylloides mineri*, new species.

a, carapace, rostrum reconstructed; *b*, eye; *c*, antennule; *d*, antennal scale; *e*, mandible; *f*, maxillula; *g*, maxilla; *h*, *i*, *j*, first, second, and third maxillipeds; *k*, major chela; *l*, minor chela; *m*, first leg; *n*, ambulatory leg; *o*, dactyl of same more enlarged; *p*, telson and uropod of left side.

stout, pointed setae; the lower margin of the dactyl is curved and protrudes a bit distally and is armed throughout with a close-set row, or comb, of low conical spines or blunt teeth. The telson differs from the characterization of this appendage, as given by Borradaile (*loc. cit.*) for the family—"The telson bears two pairs of spines

at the sides, and at the end an outer short and an inner long pair of spines, a submedian pair of feathered spines and a median pointed projection"—inasmuch as the hinder margin of the telson is armed with three pairs of more or less subequal spines. The outer pair of these spines is slightly smaller and the medial pair slightly the larger. In advance of terminal spines, but close to the hinder end, the lateral margins are armed with two small spines on either side.

GENOTYPE.—*Gnathophylloides mineri*, new species.

Gnathophylloides mineri, new species

Figure 3

DIAGNOSIS.—As given in the generic description.

SIZE.—Small, the largest, which is the type specimen (Cat. No. 6700, A. M. N. H.), being about 6 mm. long, of which the carapace and rostrum represent close to two-fifths of the length of the body, approximately 2.3 mm. One of the two paratypes has the carapace and rostrum about 1.8 mm. long.

TYPE LOCALITY.—Known only from three specimens taken from the coral reefs at Ballena Point, Ensenada, Porto Rico, June 12, 1915, by R. W. Miner and H. Mueller.

Paguristes tortugae, new species

Figure 4

Rostrum about as broad as long at the base; of the several species of *Paguristes* figured by Benedict (1901, Pls. IV, V) it is most like *P. spinipes*, though quite different in some respects. Falling among the species with eye-stalks, measured from the extremity of the rostral point to the end of the cornea, shorter than the distance between the anterolateral angles, *P. tortugae* stands nearest *P. puncticeps* but differs in its broader, triangular rostrum, which in *P. puncticeps* is more strap-shaped.

The anterior portion of the carapace is slightly more than one and one-third times as long as the greatest width across the anterolateral angles; the hinder part of the carapace is a little more than half the length of the anterior portion, its length being slightly more than three-fourths the width of the anterior portion.

The eye-stalks exceed the length of the antennular peduncle by about the length of the cornea; the antennular peduncle reaches at least to the middle of the terminal joint of the antennular peduncle or beyond; the eye-scales are armed with three spines of which the innermost is the largest, the middle one subequal to or a little smaller than the first, and the outermost, or third, is much smaller, and well down on the outer slope or margin of the eye-scale; its tip scarcely reaches the level of the bottom of the sinus or interspace between the first two.

All the limbs are bordered by a very striking and characteristic dense fringe of white hairs: on the whole extent of the upper and lower margins of the ambulatory legs, and on the upper, outer border of the chelipeds including the chelae, on which the fringe is continued along the outer margin to the corneous tip of the fixed finger; the hands are pubescent but elsewhere hairs are sparse and not particularly noticeable except for bushy tufts on the antennal scales and the fore edge of the carapace. A feature worthy of note is the fact that the hairs carry side branches on

either side of the main shaft, feather-like; in this character our species is very different from the closely related species, *P. puncticeps* and *grayi* Benedict.

More or less hidden by the thick fringe of hairs, the outer half of the palm and the outer margin of the fixed finger are beset with sharp, forwardly directed, hooked spines, likewise the median area of the upper surface of the palm; inner margin of the hand similarly armed with three stout spines. The movable finger is about one and three-fourths times as long as the inner margin of the palm measured from the articulation. As in *P. puncticeps*, the inner margins of the movable fingers and palms are quite straight, so that the chelae fit closely and snugly together when with-

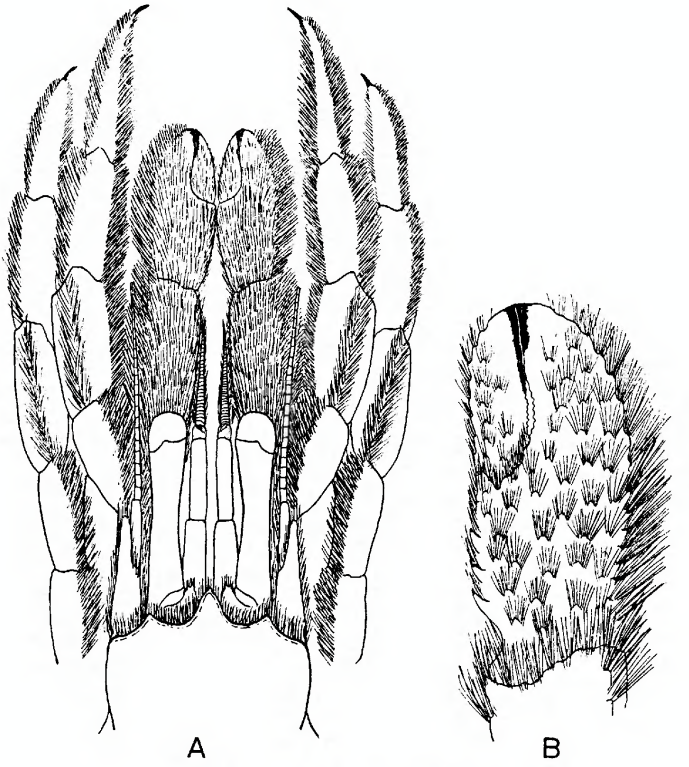

Fig. 4. *Paguristes tortugae.*

a, anterior portion to show fringes of hair and front; *b*, right chela, with part of pubescence and hairs removed.

drawn into the shell. The carpus of the right cheliped has five large spines on the inner margin, about as many slightly smaller spines on the outer margin, and three or four sharp spines on the anterior margin; the upper surface is more or less coarse-granulate with an approximately median row of sharp conical granules; the carpus is more than one and one-half times longer than its greatest width, thus being longer and narrower than the corresponding joint in *P. puncticeps* and *grayi;* in *puncticeps* it is about as wide as or slightly wider than long at the anterior end, and in *grayi* but very little longer than the greatest width. The merus is armed with a sharp

corneous-tipped spine near the anterior end of the upper margin and three good, sharp, corneous-tipped spines on the anterior margin; otherwise general surface of joint is more or less scabrous, inner lower margin armed with three or four sharp spines.

The merus of the first right ambulatory leg is denticulated on the anterior margin; the carpus has a row of conical spines or tubercles on the upper margin and a somewhat irregular second row on the inner face, in line with a similar row of seven to nine spines on the inner face of the propodus, the upper margin of which is armed with seven to eight conical, light corneous-tipped spines. About fifteen transverse tuberculiform ridges ornament the upper margin of the dactyl which terminates in a strong, dark blackish-brown corneous claw. The opposite leg is similar but less prominently spined, while the second pair of ambulatory legs are quite without spines except two not very conspicuous ones among the hairy fringe, one at and the other close to the anterior end of the upper border of the carpus. The carpus is obscurely denticulate on the upper border, but this pair of legs, though somewhat scabrous, is quite smooth in comparison to the first pair.

TYPE LOCALITY.—Because of its larger size, an ovigerous female (Cat. No. 65840, U. S. N. M.), taken from the interstices of large *Porites* clumps off the Fort Jefferson dock, Garden Key, Dry Tortugas, Florida, July 13, 1931, in company with several other specimens of the same species, has been selected as the type. The anterior, hard portion of the carapace of this female measures five mm. long.

DISTRIBUTION.—At present known only from the Dry Tortugas and Porto Rico as noted below, but no doubt to be found more widely distributed through the south Floridian and West Indian region.

SPECIMENS COLLECTED.—Ensenada: entrance Guayanilla Harbor, 5; entrance Montalva Bay, 1; mangrove island at Parguera, 1. Near Guanica, 1.